Event Investigation Program

Revision: Three

June 2016

Serial Number: _____

Assigned to: _____	**Position: _____**
AIRCRAFT N_____(if applicable)	**Date of Assignment: _____**

If found, please return this program to:

Maritime Helicopters
3520 FAA Road
Homer, AK 99603
USA
Tel. 907-235-7771

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Record of Revisions

Program Serial Number: _____

Insert all revisions immediately.

Record a brief description of the revision, effective date and the initials of the person inserting the revision.

Revision	Description of Change	Revision Effective Date	Revision Inserted By
Original	Original Issuance	15 August 2009	N/A
1	Added Appendix A	29 May 2015	D. Busch
2	Added Appendix B	10 May 2016	D. Busch
3	ISNetWorld Wording Changes for Tesoro	15 June 2016	D. Busch
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Event Investigation Program

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Event Investigation Program

1. INTRODUCTION

Investigation of civil aircraft accidents is the responsibility of the National Transportation Safety Board or similar government agency in any country that is a signatory to the ICAO Conventions. Under both ICAO and U.S. rules, the operator of a civil aircraft has certain responsibilities in the event of an accident or incident. These responsibilities include proper reporting, preservation of evidence, and support of the investigation team. The operator may also be invited by the NTSB to participate in the investigation, along with airframe and engine manufacturers, and other technical experts. To be qualified to join the investigation, invited participants must have the technical expertise to support the investigation as well as an understanding of the accident investigation process, in order to provide accurate and timely support.

Civil Aviation Authorities only become involved in those events (accident or incidents) that are required to be reported by regulation. However, many events occur that are not reportable to Civil Aviation Authorities which, under slightly different circumstances, could easily have become an accident. Maritime Helicopters therefore investigates all accidents, incidents, near-accidents, injuries and other safety-related occurrences, regardless of whether such events require a formal report to government authorities. Through these investigations, root causes and contributing factors can be identified, and risk controls or corrective actions applied to prevent similar reoccurrences.

2. ACCIDENT CAUSES

A. LATENT CONDITIONS AND ACTIVE FAILURES

Over 80% of all aviation accidents are the result of human error. Recent research and accident investigation reports suggest, however, that human error is merely the last link in a chain of events that leads to an accident. Accidents typically result from complex interactions between human error, weaknesses or deficiencies in systems, and failure of technical components, whereby **latent conditions** combine with **active failures** to produce the accident.

Latent conditions are weaknesses or deficiencies in a system that can contribute to an incident but that will not, by themselves, cause an accident. Latent conditions can lie undetected and dormant within a system for years. On their own, they are not sufficient to cause any major damage to the system, but if combined with active failures, they will inevitably lead to an accident. Examples of latent conditions include poor system or process design, inadequate supervision or risk controls, failed risk controls, improper procedures, human perceptions and attitudes (such as complacency), and impending maintenance failures that have not been detected.

Active failures are failures that have a direct impact upon the safety of a system. They are errors and failures that have an immediate adverse effect, but the effects are usually relatively short-lived. Active failures typically occur on the front-line of a system where there is almost always human interaction. Active failures include errors made by pilots, mechanics or other front-line personnel, mechanical failures, and undesired interactions or conflicts between hardware, software, and systems.

B. CHAIN OF EVENTS

In the majority of cases, accidents happen as a result of an unbroken chain of events that ultimately results in total system failure, but the events that form the chain can be controlled. As soon as the sequence of events is positively altered, the chain is broken and the accident prevented. The event is then reported as an incident, or “near-accident”.

C. BREAKING THE CHAIN

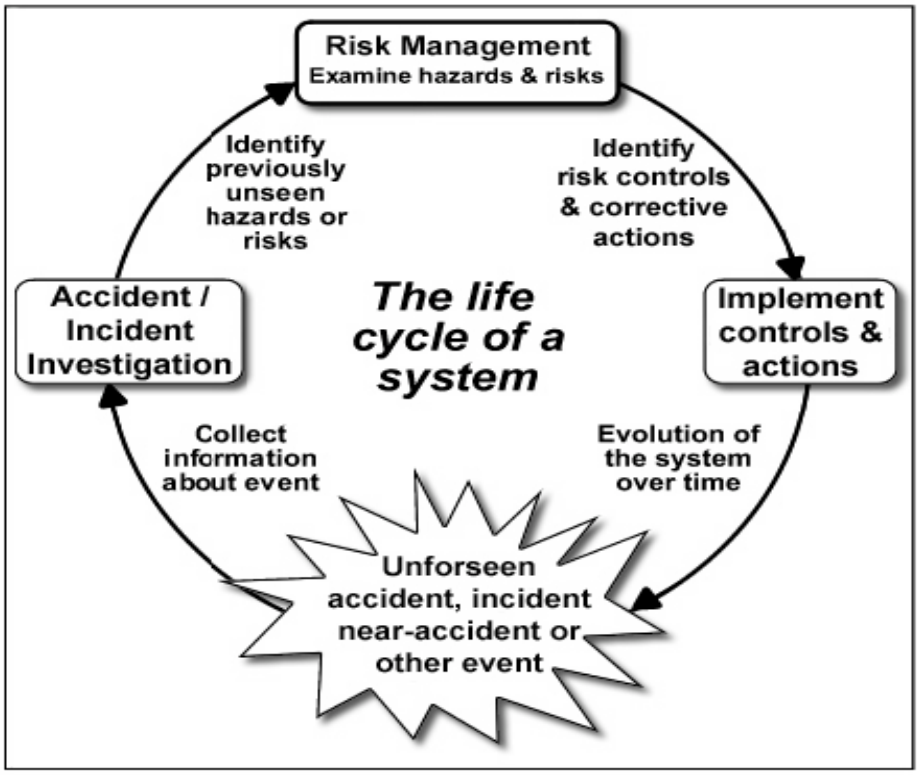
Breaking the chain is a challenge that all aviation organizations are confronted with. Some do it systematically and very effectively. Others do it by trial and error. The latter method very often costs lives and large sums of money. Accident and incident investigation enables us to identify **latent systemic deficiencies** that could have contributed to an accident or incident. Once these deficiencies or latent conditions are identified, risk controls and corrective actions may be developed and implemented to correct them.

NOTE:
Thorough and prompt event investigation is necessary to ensure that systemic deficiencies which have contributed to an accident or incident are corrected. This includes the investigation of near-accidents and other safety-related events.

3. POLICIES

A. INVESTIGATION OF ACCIDENTS & INCIDENTS

Maritime Helicopters investigates all aircraft and non-aircraft related accidents, incidents and injuries in order to determine probable causes and latent conditions which may have contributed to the event. Results of these investigations are channeled into the company's Risk Management Program for development of risk controls and corrective actions that will help prevent the reoccurrence of similar events.



Risk assessment and accident analysis (modified) (Blackett et al., 2005)

By collecting information, analyzing the event, identifying hazards / risks and implementing preventive actions, a feedback loop and cycle of continual improvement are created to ensure the continued health of MH's complex system of aviation operations and maintenance.

B. NEAR-ACCIDENTS & REGULATORY NON-COMPLIANCE

Maritime Helicopters also investigates near-accidents and other reported events, including instances of potential regulatory non-compliance. Near-accidents, near-misses, and other irregularities or occurrences may be caused by latent conditions or systemic deficiencies which have yet to be identified. These events may occur on the ground or in flight, and may or may not involve aircraft. A near-accident, for example, could involve ramp personnel narrowly escaping injury from ground equipment, or maintenance personnel accidentally spilling a hazardous substance in stores.

Near-accidents and instances of potential regulatory non-compliance are typically indicative of a system error or latent condition which, if conditions are right, could recur elsewhere at another time and potentially lead to catastrophe. They are "free" lessons learned, in that system deficiencies and gaps in system defenses may be identified without suffering the costs of an accident or injury. The results of these investigations are channeled into the company's Risk Management Program for development of risk controls, or corrective actions to risk controls that have failed to perform.

C. NON-PUNITIVE INVESTIGATION POLICY

Maritime Helicopters strongly desires to learn from all incidents, occurrences and errors made, in order to improve our systems and enhance safety. To promote and encourage the uninhibited open and honest sharing of information, all personnel are advised that no disciplinary action will be taken against any person who makes an unintentional error, even if that error results in an incident or other occurrence. Even at-risk errors (negligence) will be treated as a learning opportunity, both for the individual who made the error and the company. Only exceptional cases involving recklessness will result in a disciplinary outcome.

All personnel are therefore encouraged to participate openly and honestly in the investigation process, without the need to protect or "cover" for a co-worker who has made an error. If such an error involves a violation of regulations, MH management will make every effort to protect all employees involved from certificate action and civil penalties by assisting employees with ASRS reporting, and by developing voluntary disclosures to Civil Aviation Authorities that emphasize organizational deficiencies rather than blaming an employee. This course of action protects both the company and the individuals involved in the violation.

NOTE:

This policy will not apply to those personnel who have behaved in a "reckless" or illegal manner, or who have committed a series of human errors that indicate a general lack of care and professionalism.

D. RISK CONTROLS & CORRECTIVE ACTIONS

Development of risk controls, or corrective actions applied to risk controls which have failed to perform, are the end result of a successful investigation. They are implemented by MH management through the instructions and procedures set forth in the MH **Risk Management Program.**

Regarding personnel, corrective actions may include improved procedures, increased or enhanced training, or in rare cases involving recklessness, actions to discipline employees involved in the occurrence. Discipline is mandatory in those instances where employee carelessness or willful disregard of safety rules or MH procedures results in an accident or incident. Disciplinary action should also be considered anytime an employee exhibits conduct which shows a lack of concern for safe operating procedures, even if no accident results.

Proposed risk controls, corrective actions and comprehensive fixes will be reviewed by MH supervisors and department managers. In the event of disagreement as to causes or solutions, the matter will be resolved by the Safety Committee or the appropriate risk-decision authority.

E. CONFIDENTIALITY

Certain managers and other MH employees may be called upon to investigate an accident, incident, near-accident or other safety-related event. These company representatives may be invited by Civil Aviation Authorities to provide technical information and expertise during a formal accident investigation, or may be working independently when investigating non-reportable occurrences. In any case, MH investigators shall not speculate or offer opinions or theories regarding the cause of an accident to any person or persons.

All information relative to an accident or incident should be treated as extremely sensitive and held in strictest confidence; no information should be given to any employee or other person. "Heat of the moment" statements may be admissible as evidence in court trials involving liability even though they may be hearsay.

Therefore, it is MH company policy and in the best interest of all concerned to decline responses to questions that seek an expression as to the cause of any accident. All communication with regard to an accident / incident or other emergency will come from senior management only, and all inquiries should be referred to either the appropriate Civil Aviation Authorities or MH senior management for response.

4. OBJECTIVES

A. TIMELY AND APPROPRIATE INVESTIGATIONS

Investigations of major or minor accidents, or an incident resulting in personnel injury or illness, should be initiated within 24 hours after the occurrence. If it becomes apparent that more than 72 hours will be required to investigate the occurrence, notify the Safety Officer and follow up with status until investigation notes can be entered into Incident Reporter or FIR/GOR record database. The severity of the incident will determine the level of investigation as well as the level of reporting to governmental agencies. The Safety Manager, along with the Chief Pilot, Director of Maintenance, and Director of Operations will confer on the depth of investigation, (e.g. Interviews or collection of physical evidence).

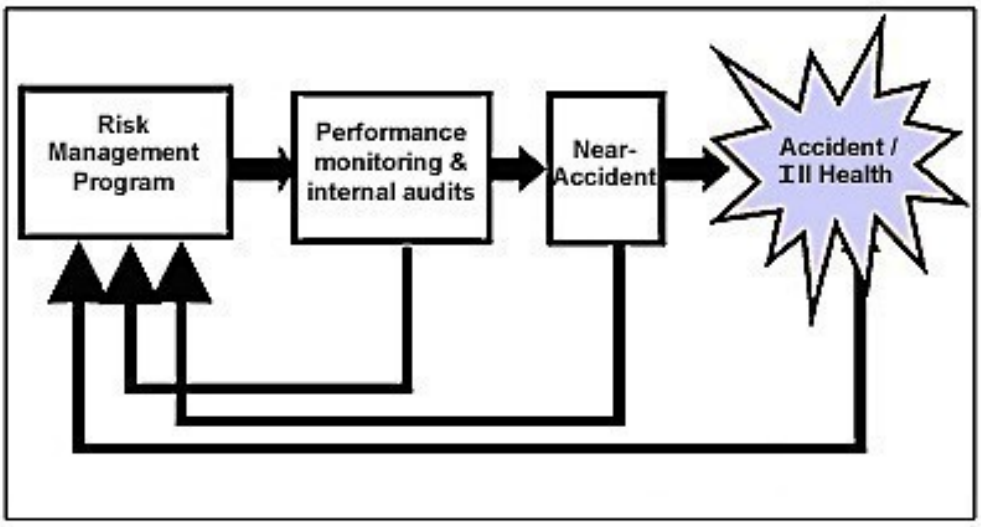
NOTE:
Investigations of incidents with only minor damage and no injury or illness should commence as soon as circumstances permit. Complete the investigation and enter notes into IR within 10 calendar days.

B. IDENTIFICATION OF HAZARDS & LATENT CONDITIONS

The objective of all MH event investigation efforts is to identify and analyze hazards and latent conditions within MH's aviation system that may have contributed to an accident, incident or other safety-related event. These may be previously established risk controls which are no longer performing to expectations (for example, employees taking shortcuts in normal operating procedures), or new hazards as a result of system changes (such as system element computerization, the introduction of new equipment or a change in operating season or geographic area of operations).

C. APPLICATION OF RISK MANAGEMENT

By identifying all root causes and contributing factors, including human factors, systemic factors and other latent conditions that may have contributed to the event, risk management efforts are applied through the MH **Risk Management Program**. Application of risk management results in the implementation of new risk controls, corrective action to failed risk controls, and communications of lessons learned, in order to preclude a similar event from occurring in the future.



How investigation outputs become inputs for safety risk management

D. DISSEMINATION OF LESSONS LEARNED

Most company investigations of accidents, incidents, near-accidents or other events should result in the identification of one or more latent conditions which are systemic or organizational in nature, and may have contributed to the event. These root causes, contributing factors and any risk controls or corrective actions implemented by MH management will be disseminated throughout the organization as **safety lessons learned** to appropriate managers and personnel using various methods of communication as set forth in the MH **SMS Manual.** Lessons learned are communicated in order for all personnel to see the results of the company's investigative efforts, and to arm personnel with knowledge and information that will aid them in preventing similar events from occurring in the future. Lessons learned may also be shared with other operators, regulators and the aviation industry in general.

5. TERMINOLOGY

The term 'accident' as used herein refers to both accidents and incidents, unless otherwise stated. The term 'system' is used to refer to the functionally related parts of the organization, such as:

- Equipment,
- Technology,
- Individual employees,
- Employee groups,
- Supervisors,
- Management, and
- The working environment.

An occurrence is any event other than normal operations that is not an accident or incident. Refer to the MH **SMS Manual Section 6: Employee Reporting System** for further clarification of events that are considered occurrences.

6. ROLES & RESPONSIBILITIES – AIRCRAFT ACCIDENTS & INCIDENTS

A. CIVIL AVIATION AUTHORITY NOTIFICATION

When an aircraft accident or incident occurs (as defined by Civil Aviation Authorities), the event must be reported to the appropriate Civil Aviation Authority in accordance with company procedures and the rules of the governing State.

Any employee who becomes aware of any of the listed occurrences specified below shall immediately notify MH management personnel. Upon receipt of such notification, the Director of Operations shall immediately notify the appropriate Civil Aviation Authorities that an aircraft accident/incident has occurred. The Director of Operations shall furnish all agencies with the information required to be provided by regulations.

The Director of Operations (or Manager on Duty in the absence of the Director of Operations) shall immediately, and by the most expeditious means available, notify the appropriate Civil Aviation Authorities when an aircraft accident or any of the following listed incidents occur:

- Flight control system malfunction or failure;
- Inability of any required flight crewmember to perform his/her normal flight duties as a result of injury or illness;
- Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes;
- Inflight fire; or
- Aircraft collide in flight.

Immediate notification is also required by the most expeditious means available, whenever damage to property, other than aircraft, estimated to exceed $25,000 for repair (including materials and labor) or fair market value in the event of total loss (whichever is less). These notification requirements further apply to the company's large multiengine aircraft whenever:

- Inflight failure of electrical systems which requires the sustained use of an emergency bus powered by a backup source such as a battery, APU, or air-driven generator to retain flight control or essential instruments
- Inflight failure of hydraulic systems that results in sustained reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces
- Sustained loss of power or thrust produced by two or more engines; and
- An evacuation of an aircraft in which an emergency egress system is utilized.

Immediate and expeditious notification shall be provided to Civil Aviation Authorities whenever an aircraft is overdue and is believed to have been involved in an accident, regardless of the rules under which the flight was being operated.

B. CREWMEMBERS

In the event of an aircraft accident, the flight crew should ensure that the injured receive required medical attention. The flight crew may be required to stay with the aircraft until arrival of competent authority (FAA, NTSB, airport security, local police, etc.). Until relieved by MH personnel, the ranking crew member (by crew position) should act as official-in-charge. The Manager on Duty can provide guidance according to the Emergency Response Plan.

Do not make statements to government or civilian authorities or to the media. Politely state that you will be willing to discuss the mishap after company representation. Crewmembers will be expected to debrief with the Civil Aviation Authority's investigation team and the team will understand your need for consultation.

Public release of any information concerning an accident or incident involving company aircraft, employees, property, or facilities shall not be made by flight operations personnel. All requests for such information from public or news media persons should be referred to MH senior management or to the Civil Aviation Authority's Investigator-in-Charge.

C. COMPANY FIRST-PERSONS

The Emergency Response Plan provides detailed guidance for those MH personnel who may be the first to arrive at the scene of an accident. First priorities are medical attention to the injured, and protection of personnel from further injury. If possible, remain in communication (via cell phone) with the Manager on Duty for guidance from the Emergency Response Plan.

D. STATES' RESPONSIBILITIES

Depending on where an accident occurs, various States (countries) will have a status that determines rights, obligations, entitlement and participation in the investigation. As a general rule, the accident investigation body of the State or country in which an accident occurs will conduct the investigation. This may be the country's Civil Aviation Authority, or a separate entity such as the NTSB, which is separate from FAA in the United States.

The State conducting the investigation is responsible for releasing the Final Report as soon as possible. It is recommended that, unless it has been released within twelve months after the occurrence, an interim report is released describing the progress of the investigation and any safety issues raised.

The Final Report will contain safety recommendations; a set of actions necessary to be taken to enhance aviation safety. The format of the Final Report typically follows the process of the investigation:

- (Gathering of)Factual Information,
- Analysis,
- Conclusions
- Safety Recommendations.

E. ROLE OF INVESTIGATIVE AUTHORITIES

The role of an investigative authority is to investigate accidents, determine the probable cause, and develop safety recommendations to preclude a reoccurrence. Pursuant to statute and regulation, the investigator-in-charge may designate "parties" to assist in such an inquiry, but parties are only to be those persons, government agencies, companies and associations whose employees, functions, activities, or products were involved in the accident and who can provide "suitable qualified technical personnel actively to assist in the investigation. Most investigative authorities appoint an investigator-in-charge (IAIIC) for every accident.

F. ROLE OF CIVIL AVIATION AUTHORITIES

Civil Aviation Authorities are responsible for the investigation of all accidents within their jurisdiction or geographical area, and must determine the facts surrounding any accident and whether any aircraft operator involved in an accident was in compliance with the regulations. For every accident which is jointly investigated, the Civil Aviation Authority appoints an investigator-in-charge (CAA IIC) to assist the IA IIC and to determine the level of CAA involvement. During this joint accident investigation, the CAA retains authority for investigating regulatory compliance. Through signed agreements, the IA IIC has agreed to keep the CAA IIC informed of all aspects of the investigation, and to make pertinent investigation records and reports available in a timely and orderly manner.

NOTE:
CAA Inspectors should have completed Aircraft Accident Investigation training before acting as a CAA IIC during accident investigations.

G. OPERATOR'S DESIGNATION AS PARTY TO THE INVESTIGATION

Under international ICAO Annex 13 rules, the Investigative Authority Investigator In Charge (IA IIC) has the discretion to designate parties that are allowed to participate in an investigation. Except for the local Civil Aviation Authority, party status is a privilege and not a right. Maritime Helicopters, as the operator, may become an authorized party to provide knowledge and expertise, and should request party status if not invited to join the investigation. The Investigative Authority needs the company's expertise, and MH needs to participate as an essential element of its accident prevention program. A team effort is necessary in order to develop a complete and accurate factual record of the accident. Each party representative must work under the direction of the IA IIC or other senior investigators at all times.

MH managers who possess substantial knowledge or expertise are typically selected by senior management to participate as party representatives on behalf of the company. Manufacturers' representatives may also be solicited by the official investigating body to contribute knowledge and expertise. Persons in legal or litigation positions are specifically not permitted by Investigative Authorities to participate in accident investigation. No members of the news media or insurance personnel are permitted to participate in any phase of the investigation. Claimants or litigants (victims or family members) are also specifically prohibited from serving as party members.

H. ROLES OF COMPANY INVESTIGATORS

Specialists selected by senior management to participate as party representatives must be employees of MH and must possess expertise to assist the Investigative Authority in its investigation. Providing technical assistance gives parties many opportunities to learn what happened and to formulate theories as to the cause of the accident. Party representatives are not permitted to relay information back to corporate headquarters without the consent of the IA IIC, and then only when necessary for accident prevention purposes. Information is not to be used for litigation preparation or for public relations. Sanctions for failing to abide by the Investigative Authority's party rules and procedures include the dismissal of individuals or even the party from the investigation team. Party representatives must sign a party pledge, which a written statement is agreeing to abide by the Investigative Authority's rules governing the party process.

I. QUALIFICATIONS OF COMPANY INVESTIGATORS

Department managers may investigate injuries, hazards, errors, occurrences and near-accidents within their respective departments. However, before being assigned to investigate a reportable accident or incident (as defined by NTSB reporting requirements) investigators must have received and successfully passed, suitable course of training which includes an accident investigation curriculum.

NOTE:
The Safety Officer maintains a current listing of all persons qualified to Investigate NTSB-reportable accidents and incidents within MH, and shall not assign persons as investigators unless properly qualified.

7. ASSISTING CIVIL AVIATION AUTHORITIES OTHER OFFICIAL INVESTIGATIVE BODIES

A. SHARING OF INFORMATION

As party to an accident investigation, MH investigators will participate openly, honestly, and with the highest level of integrity, animated by the notion that safety will be furthered by the expeditious determination of an accident's cause. It is important that all personnel involved with the accident investigation be aware of the other parties and their teams in order to establish communication channels for obtaining and exchanging information.

B. DOCUMENT CONTROL

Document control is critical during an investigation. Only department managers or their delegates are authorized to copy, print or otherwise reproduce MH records and documents. When official investigators request copies of company records or other documents, copies shall be made in duplicate. One copy shall be for the requesting investigator and the other for retention by the Safety Officer. Originals shall be promptly returned to their original location, and a record kept of all documents provided, complete with the date copied and the name of the requesting investigator and agency.

C. DUAL ROLES OF MH INVESTIGATORS

When participating as party to an investigation, MH investigators serve in dual roles. In addition to providing knowledge, information and technical expertise to official agencies, company investigators should strive to identify latent contributing factors within their respective areas of expertise and departments that are systemic or organizational in nature. When serving in this capacity, company investigators **must not speculate** on possible organizational deficiencies that could result in potential liability for MH.

8. PROCEDURES FOR REPORTING

A. INITIAL REPORTS OF ACCIDENTS & INCIDENTS

All accidents and incidents must promptly be reported to management in the most expeditious way possible. Initial reporting by telephone is typically the most expeditious and preferred method. Emergency reporting procedures may be found in the MH **Emergency Response Plan**, including names and telephone numbers for notification of MH management personnel. All information received regarding the accident or incident shall be communicated to management personnel as soon as possible.

B. FORMAL REPORTS OF ACCIDENTS, INCIDENTS & OTHER EVENTS

Procedures and instructions for submitting formal reports of accidents, incidents, injuries, irregularities, occurrences and other events are contained in the MH **SMS Manual Section 6: Employee Reporting System**, and shall be followed by all personnel. A documented account of the accident, incident or occurrence will be submitted as soon as possible, normally no later than 24 hours after the event.

If an aircraft accident or an aircraft incident occurs, an Accident/Incident Report form should be utilized. In the event of a ground accident or ground incident, utilize the appropriate form, or report directly into the IR database.

All aircraft-related reports should either be entered into the IR database or faxed to the Manager on Duty. As a backup, the Manager on Duty will forward the reports to the Safety Officer and other applicable departments. A hand-written Flight Irregularity Report of Ground Occurrence Report (FIR/GOR) will most often be the most expedient way to communicate the initial report. Fax or email these to the Safety Manager, Chief Pilot or Director of Operations.

Report online at Maritime's Website (http://maritimehelicopters.com/) and click on "Safety."

9. DRUG & ALCOHOL TESTING

Employees involved in an NTSB-reportable accident are required to undergo a drug and or alcohol test in accordance with the company's ADAMP. All employees serving in safety-sensitive positions who fall under the company's ADAMP and are involved in a NTSB -reportable accident or incident must also be tested for drug use and alcohol misuse.

A drug and/or alcohol test should also be considered in a minor accident, incident, and high accident potential cases if in the supervisor's judgment, there is reasonable suspicion that the employees' actions may have been the result of drug and/or alcohol use. When a drug or alcohol test is accomplished on any employee, it must be noted on the accident report form or in the employee's records. MH managers should also consider reasonable cause testing for an employee if event investigation reveals that drug use and/or alcohol misuse may have been a contributing factor, regardless of whether or not the employee is subject to drug /alcohol testing under the ADAMP.

10. THE INVESTIGATION PROCESS

An investigation has to provide answers to what happened, why it happened, how it happened and how the reoccurrence can be prevented. This is done by:

- Gathering factual information surrounding the incident, near-accident or event.
- Analyzing facts while recognizing difficulties in the analysis such as hindsight, perceptions and judgments.
- Performing root cause analysis, with particular attention being paid to contributing factors.
- Drawing conclusions, making sure they are understandable, correct and traceable.
- Considering recommendations to prevent reoccurrence, with emphasis on systemic and organizational improvements.

11. ACCIDENT CAUSES

An aviation accident is seldom caused by a single factor such as human error or material failure. Accidents are more likely to result from several latent conditions which, when combined with a failure, result in an accident. This fact must be recognized when determining root causes. During investigation of all accidents, incidents, near-accidents, errors and other events, the following areas should be considered:

- Human factors;
- Selection, training, education and promotion of personnel;
- Equipment design, adequacy, and supply;
- Normal and emergency procedures;
- Maintenance;
- Facilities and services, including those provided by vendors;
- Environment.

12. HUMAN FACTORS

A. INTERVIEWING TECHNIQUES

To find out why humans did what they did, it is often important to talk to them. Interviews will be part of the fact – finding and analysis step of an investigation. Interviews should be structured and conducted by the appropriate manager who possesses knowledge and skills relative to the person being interviewed. It is essential to keep interviews factual and blame free, avoiding judgment.

Interview questions should be fact-finding, not interpretive in nature. "What did you observe?" is an appropriate question. "What was your co-worker thinking?" is not an appropriate question. Questions that lead the person being interviewed to speculate should be avoided. Congruent answers by other persons who were present (and should be interviewed separately) will help to establish facts versus misperceptions.

B. INFORMATION SEEKING

When investigating an accident, incident, near-accident or other safety-related event, various processes may be used by the investigator to obtain information:

- **Surveying** comprises activities that form the initial search for information, obtaining an overview of the subject terrain or key sources of information, and identifying sources that could be used for information. These sources are likely to point to, suggest, or recommend additional sources or references.
- **Chaining**, as a way to follow up on initial sources, can be backward or forward. Backward chaining takes place when pointers from an initial source are followed. Forward chaining takes place through identifying and following up on other sources that refer to an initial source, thus broadening a search.
- **Browsing** is semi-directed or casual search in areas of potential interest. This is looking for information at the micro-event level and remaining unconstrained or open to serendipitous findings; finding new connections or paths to information.
- **Distinguishing** (or discriminating) refers to filtering and selecting from among identified sources scanned by noticing differences between the nature and the quality of the information offered. Distinguishing is likely to depend on prior experiences with sources or recommendations from others. Information sources are ranked, including noting from where information comes.
- **Monitoring** refers to keeping abreast of developments in an area through regularly following particular, or core, sources.
- **Extracting** is the process of systematically working through a particular source or sources to identify material of interest, directly consulting the source and using the information provided.
- **Filtering** capitalizes on personal criteria or mechanisms used to increase information precision and relevancy. This can involve restricting search for information.
- **Verifying** is where the accuracy of information is checked.
- **Ending** refers to the conclusion of the information seeking process where the information need is satisfied.

13. INVESTIGATIVE METHODS & PROCEDURES

A. METHODS

The company utilizes a model for investigating and analyzing accidents, incidents and other events which is based on an established and frequently used method, called **Safety through Organizational Learning (SOL).**

SOL allows MH investigators to examine an event from several different viewpoints, and to uncover the factors that contributed directly to the accident, as well as those hidden factors that contributed indirectly to the accident. SOL is focused towards uncovering human, organizational and social factors.

Most minor events, reported hazards and safety concerns can be investigated, and root causes determined, without the aid of SOL checklists. However, these checklists should still be referred to, in order to stimulate "outside-the-box" thinking that may reveal hidden systemic or organizational contributing factors.

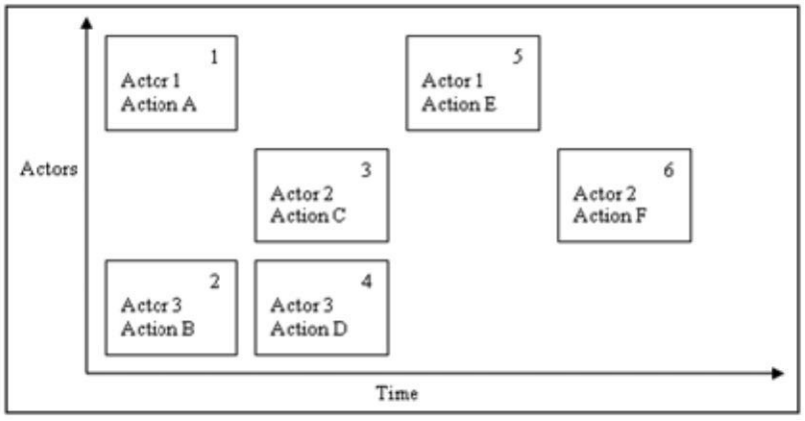
For accidents, incidents and near-accidents, use the following procedures and SOL checklists provided at the end of this program. This should result in a comprehensive investigation that will uncover hidden factors, or latent conditions, that may have contributed to the accident or incident.

NOTE:
Remember to treat near-accidents with the same level of importance as accidents and incidents. Lessons learned from near-accidents are "free" in that they will uncover systemic and organizational deficiencies without incurring the actual costs of an accident.

B. SAFETY THROUGH ORGANIZATIONAL LEARNING INVESTIGATION PROCEDURES

The following procedures should be used by all company investigators when investigating significant occurrences, including accidents, incidents and near-accidents. When working with other MH investigators, perform these tasks as a group, but only after each investigator has individually gathered sufficient factual information surrounding the accident, incident or near-accident. During this process, it may be necessary to go back to witnesses or other persons interviewed in order to clarify the facts and timeline surrounding the accident or incident.

- Write a situational description of what happened. This should be written as soon as possible after the occurrence. Do not attempt analysis at this point.
- Break the description down into individual events, detailing the actions and actors involved in the lead-up to the accident or incident. The information for each individual event is recorded on an index card, called an Event Building Block (EBB). Information recorded in an EBB includes the time, location, actor(s), action(s) and any other remarks about each individual event that may be relevant.
- Arrange the EBBs into a Time-Actor Diagram, which is a temporal representation of the events leading up to the accident or incident. The diagram allows investigators to identify, at a glance, the sequence of events and which actors were involved at different stages during the accident or incident.
- Analyze each EBB in the diagram (using SOL checklist 1) to determine whether it is a contributing factor. A simplified Time-Actor Diagram is shown below.



Simplified Time-Actor Diagram

SOL checklists provide a number of questions relating to six subsystems, which will guide investigators in their identification of contributing factors. SOL checklists are divided into two parts:

- **SOL Checklist 1**, with six directly contributing factors, and
- **SOL Checklist 2**, with nineteen indirectly contributing factors.

The checklists also provide sample answers, as can be seen in the example below. Continue the analysis until at least two contributing factors have been identified. For complex investigations that may involve several departments and actors (e.g., pilots, mechanics, flight followers, vendor employees, ATC personnel), several directly contributing and indirectly contributing factors may be identified.

Directly Contributing Factor
E. Violations *"Have there been conscious violations?"*
Examples are: - Inappropriate transfer of processes from other situations - Work performance that violates at least partly prescribed rules - Inadmissible reductions during work performance - Non-compliance with safety regulations - Evading of control principles("4-eyes-principle") - . . .

C. RECOMMENDATIONS

After event investigation has taken place and causal factors have been identified, investigation notes are entered into the IR database, together with suggestions for correction. When more than one investigator has been assigned, investigators should include their initials next to their investigation notes and suggestions for correction, in order to identify which investigator made the data entries.

Causal factors can be divided into those that directly caused the accident, and those that indirectly contributed to the accident. The direct causal factors represent the greatest threat to the system and require immediate action. Recommendations developed for these factors should be implemented as soon as possible. Indirect causal factors, while still important, typically do not represent an immediate threat to the system. Such recommendations should be prioritized and implemented as soon as practicable.

Department managers should use their knowledge and experience of departmental procedures, methods and operating environment to develop recommendations from causal factors. Personnel selection, training, qualification and experience levels should also be considered. Human factors that may have contributed to an accident or incident are also considered when developing recommendations.

D. APPLICATION OF RISK MANAGEMENT

For minor events, reported hazards and safety concerns that are confined to a particular department, the department managers develop appropriate Corrective Action Plans, which may include one or more risk controls, corrective actions and communications of lessons learned. Follow-up audits should always be performed by an auditor who is outside the department that developed the risk control or corrective action. This important control serves to confirm conformance and efficacy of all controls, actions and communications effected by the department manager.

For accidents, incidents and near-accidents, including those concerns that may affect more than one department, recommendations are brought before the Safety Committee for review and application of risk management. Based on these recommendations, department managers develop corrective actions and/or risk controls specific to their respective departments. Senior management, department managers or the Safety Officer may convene an emergency meeting of the Safety Committee if causal factors warrant.

14. CONTROLS

The following controls have been incorporated into the Event Investigation process:

A. TIMELY INVESTIGATIONS

Upon receipt of a report regarding an event that warrants investigation, the Safety Officer or appropriate department manager creates a new Risk Management Record within the IR database and assigns a lead investigator and due-date for completion of the investigation. The Safety Officer will review all "Open" records on a weekly basis to ensure that all investigations are completed in a timely manner.

B. ASSIGNING INVESTIGATORS

The Safety Officer assigns investigators to investigate accidents, incidents and near-accidents as a control to ensure that only qualified investigators are assigned.

C. USE OF SOL CHECKLISTS

SOL checklists serve as a control to ensure that investigators consider the many potential contributing factors when performing the Investigation process.

D. PROCESS MEASUREMENT

Safety Committee meetings serve as a control to ensure:

- That events are being investigated in a timely manner;
- That Investigation process outputs become inputs for Safety Risk Management;
- That the Investigation process is functioning as intended, with satisfactory outputs.

15. SAFETY THROUGH ORGANIZATIONAL LEARNING (SOL) CHECKLISTS

The following pages contain checklists of contributing factors as used by the ***Safety through Organizational Learning (SOL)*** method of event investigation, to identify the causal factors of accidents, incidents and near-accidents. Checklists 1 and 2 are divided into six directly contributing factors and nineteen indirectly contributing factors, respectively. The purpose of these checklists is to uncover the factors that directly caused the event, and to further uncover the underlying hidden factors which may have contributed to the event.

The investigator will analyze each Event Building Block (EBB) in the SOL Time-Actor Diagram individually and in turn, checking it against SOL Checklist 1 to determine if any direct factors apply to the event. If so, the investigator will then also check the EBB against SOL Checklist 2 for indirect factors that are specified by the direct factor.

For example, if the investigator chooses from Checklist 1's list of direct factors:

- **Factor A. Representation of information**

…then he/she is also prompted to examine from Checklist 2's list of indirect factors:

- **Related factors 1, 2, 3, 6, 10, 14, 15, 16, 17, 19, 20**

…to see if any of these also apply to the Event Building Block being examined.

16. SOL CHECKLIST 1: DIRECTLY CONTRIBUTING FACTORS

A. REPRESENTATION OF INFORMATION

- **Did problems arise due to representation of information?**

Examples include:

- Incomplete or missing display of parameters
- Failure in the display of parameters
- Disturbances in representation of information
- Inadequate representation of information
- Too much information at the same time
- Information which is difficult to distinguish
- Unknown or ambiguous information
- – ...

Go to **indirect** factors: 1, 2, 3, 6, 10, 14, 15, 16, 17, 19, 20

B. COMMUNICATION

- **Were there difficulties or disturbances in communication?**

Examples include:

- Missing or insufficient communication
- Incomprehensible transmission of information
- Misunderstanding in communication
- Difficulties or disturbances of communication tools
- Missing controls as to whether information was understood
- Disturbances of transmission of information between departments, etc.
- – ...

Go to **indirect** factors: 2, 3, 11, 13, 14, 16, 17, 19, and 20

C. WORKING CONDITIONS

- **Has there been a negative effect of working conditions?**

Examples include:

- Disturbing working conditions that are detrimental to health
- Disturbances, interruptions or distractions during task performance
- Time pressure or pressure of achievement during performance
- Inadequate technical equipment ,tools or supplies
- Problems due to missing opportunities to improve or influence the task or process
- – ...

Go to **indirect** factors: 1, 3, 6, 10, 13, 14, 16, 18, 19, and 20

D. PERSONAL PERFORMANCE

- **Has there been an influence of personal performance?**

  Examples include:

  - Insufficient performance
  - Wrong sequence of working steps
  - Not using requisite working procedures
  - Not using requisite working tools
  - Interruption of work
  - Incorrect finishing of work
  - – ...

  Go to **indirect** factors: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 20

E. VIOLATIONS

- **Has there been a violation? (of regulations or of company policies / procedures)**

  Examples include:

  - Inappropriate transfer of processes from other situations
  - Work performance that violates at least partly prescribed rules or procedures
  - Inadmissible reductions during work performance
  - Non-compliance with safety regulations
  - Evading of risk controls or control principles
  - – ...

  Go to **indirect** factors: 1, 3, 5, 6, 8, 9, 10, 11, 12, 13, 18, 20

F. TECHNICAL COMPONENTS

- **Were there problems with technical components?**

  Examples include:

  - Failure of a technical device/component
  - Malfunction of a technical device/component
  - Wear and tear/corrosion/defect of technical component
  - False or inaccurate design specification of technical component
  - False or inaccurate limitations of time controlled items
  - Suspected Unapproved Parts (SUP)
  - – ...

  Go to **indirect** factors: 4, 13, 14, 15, 16, 17, 18, 19, 20

17. SOL CHECKLIST 2: INDIRECTLY CONTRIBUTING FACTORS

1. REPRESENTATION OF INFORMATION

- **Have there been problems due to representation of information?**

  Examples include:

  - Parameters were often indicated incompletely, ambiguous or incorrectly
  - Representation of information often not adequate
  - Frequent occurrence of false alarms
  - Override of a warning system
  - Missing consideration of human information capacities
  - Unavailable parameters/criteria for determining the state of the system/components
  - Missing possibility of controlling the display/alarm
  - – ...

2. COMMUNICATION

- **Have there been difficulties or disturbances in communication?**

  Examples include:

  - Unsuitable or missing rules for oral or written communication
  - Missing recovery of barriers or disturbances in communication between or within departments, etc.
  - Problems with technical communication tools
  - Delayed or missing spread of important information
  - Missing rules for spreading of information about implemented changes
  - Missing or incomplete information during shift changes
  - – ...

3. WORKING CONDITIONS

- **Has there been a negative effect of working conditions?**

Examples include:

- Missing prevention against disturbing working conditions that are detrimental to health
- Restrictions due to inconvenient rules regarding working time or breaks
- Missing protection against disturbances during work performance
- Missing variety by one-sided division of functions between operator and machine
- Technical equipment which is often unsuitable
- Insufficient/missing user friendliness, usability and access to working tools
- Missing protection against wrong operation
- Missing possibilities of intervention during a process when problems arise
- – ...

4. PERSONAL PERFORMANCE

- **Has there been an influence of personal performance?**

Examples include:

- Inadequate preparation of work
- Inadequate flight planning
- Inadequate enroute monitoring
- Improper personal access to or availability of equipment / tools / documents
- Insufficient performance at the design phase of a job, process or component
- Insufficient performance during the production phase of a job or component
- Insufficient performance at installation or implementation
- Insufficient performance during maintenance
- – ...

5. VIOLATIONS

- **Have there been violations? (of regulations and/or company policies/procedures)**

Examples include:

- Tolerance of a generally current practice for the performance of particular tasks that violates at least partly the prescribed rules
- Missing precautions against violations resulting from ignorance
- Missing sanctions (discipline) for violations
- Continual evading of risk controls or control principles
- – ...

6. OPERATION SCHEDULING

- **Has planning of work been insufficient?**

Examples include:

- Inadequate time for task performance
- Contradicting tasks
- Tasks or assignments not adjusted to qualifications of operators
- Ambiguously formulated tasks
- Insufficient or missing coordination of tasks
- Insufficient discussion of tasks
- Missing balance of group composition regarding diverse qualification and experience
- Emergence of time pressure or stress due to task overload, difficulty of tasks or missing resources
- Ambiguous distribution of tasks
- – ...

7. RESPONSIBILITY

- **Have responsibilities been regulated ambiguously or have they been unknown?**

Examples include:

- Unclear arrangement of responsibilities
- Missing assignment of responsibility for important tasks
- Discrepancy between the official and unofficial distribution of roles
- Ambiguous division of work between departments
- – ...

8. CONTROL AND SUPERVISION

- **Was the operator's performance not controlled or supervised sufficiently?**

Examples include:

- Missing "4-eyes principle" (RII Items, checklist confirmations)
- Missing protection against violations of the "4-eyes-principle"
- Missing control of the work by supervisors or co-workers
- Inadequate supervision
- Missing self-control of work results
- Attaching too much importance to work results in comparison to safe performance
- – ...

9. GROUP INFLUENCE

- **Has there been a group influence?**

Examples include:

- Varying judgment of the group's performance
- Misjudgment of the group's performance
- Missing acceptance or missing attention to controversial opinions within the group
- Inadequate or poor decisions caused by group influence
- Common violations of regulations or rules
- Poor attitudes regarding risk controls and/or safety in general
- – ...

10. RULES, PROCEDURES AND DOCUMENTS

- **Have there been problems with rules, procedures or work documents?**

Examples include:

- Inadequately developed rules, procedures or work documents
- Inadequately updated or revised rules, procedures or work documents
- Missing rules, procedures or work documents
- Contradictory rules, procedures or work documents
- Unknown rules, procedures or work documents
- Incomprehensible rules, procedures or work documents
- Rules, procedures or work documents are difficult to handle
- Rules, procedures or work documents can't be carried out
- – ...

11. QUALIFICATION / COMPETENCE

- **Have there been hints of insufficient qualification or competency?**

Examples include:

- Not enough experience of employees
- Insufficient on the job training
- Missing checks of required qualifications
- Unsuitable, undefined or missing criteria for personnel selection
- Discrepancies between qualifications and position in hierarchy
- Incomplete consideration of extra-occupational (social) competence in personnel selection
- – ...

12. TRAINING

- **Have there been problems due to inadequate training?**

  Examples include:

  - Missing or insufficient possibilities for training
  - Ineffective training measures
  - Too much intervening time between training measures
  - Missing evaluation of training results
  - Insufficient training for hazards
  - Insufficient training for the situation encountered
  - – ...

13. ORGANIZATION AND MANAGEMENT

- **Has there been an influence of organization or management?**

  Examples include:

  - Missing acceptance of employees of company objectives / goals
  - Company goals not taken seriously or not properly represented / conveyed by management
  - Missing resources for achieving objectives and goals
  - Achievement demands by management too high
  - Missing resources for necessary improvements
  - Missing company rules or procedures for improving recognized problem areas
  - Implementation of improvements too slow (bureaucracy)
  - – ...

14. FEEDBACK OF EXPERIENCE

- **Has there been sufficient use of operational experience?**

  Examples include:

  - Missing rules or procedures for feedback of experience
  - Problems with certain systems / areas not applied to other systems / areas
  - Experiences of other operators/companies not taken into account
  - No introduction of necessary measures / risk controls for known problems
  - Discoveries from similar events not taken into account
  - – ...

15. SAFETY PRINCIPLES

- **Has there been an influence of missing safety principles?**

Examples include:

- Missing diversity of components/displays
- Insufficient spatial separation of redundancies
- Missing or insufficient redundancy or distinction of redundant components
- Missing information on the requisite use of components
- Missing warning systems and safety functions
- Missing safety attributes
- Missing hazard identification/safety risk analyses/assessments
- Missing or inadequately monitored risk controls
- Missing constructive precautions against wrong handling
- Missing separation of danger sources
- – ...

16. QUALITY MANAGEMENT

- **Have there been problems with quality management?**

Examples include:

- Inadequate quality control or inadequate quality management
- Missing or inadequate application of quality management on vendors/suppliers
- Unsuitable quality control/management of vendors and contractors
- Missing experience of vendors/contractors with company procedures and work documents
- Weakness and faults in technical installations
- Missing organizational adjustment to new developments
- Compatibility problems of systems/components
- – ...

17. MAINTENANCE

- **Has there been an influence of maintenance?**

Examples include:

- Missing maintenance or too long inspection/service intervals
- Missing maintenance or too long component time limits
- Missing or insufficient control of maintenance activities
- Inadequate maintenance due to a change in operating environment/cycles/hours
- – ...

18. REGULATORY BODIES

- **Has there been an influence of regulatory bodies and/or their decisions, actions or inactions?**

  Examples include:

  - Difficulties in cooperation between managers and regulators
  - Availability of regulatory personnel
  - Performance of regulatory personnel (approval/acceptance/monitoring/checking activities)
  - Disturbance or delay of operations due to regulatory demands
  - Influence of the regulatory environment (culture) on personnel (e.g., fear of certificate action)
  - –…

19. ENVIRONMENTAL INFLUENCE

- **Has "environmental influence" played a role?**

  Examples include:

  - Runway surface conditions
  - Visibility conditions
  - Lighting conditions
  - Temperature/humidity conditions
  - Noise conditions
  - Extreme weather conditions
  - Natural phenomena such as lightning, flood, or earthquake
  - Act of sabotage/attack
  - –…

20. HUMAN FACTORS

- **Have "human factors" played a role?**

  Examples include:

  - Physical factors (strength, height, reach, vision, hearing, impairments)
  - Physiological factors: (oxygen availability, general health and fitness, disease or illness)
  - Physiological factors: (tobacco, drug or alcohol use, personal stress, fatigue or pregnancy)
  - Fatigue from environmental or ergonomic extremes
  - Sleep deprivation/ circadian rhythms
  - Psychological factors (adequacy of training, knowledge, experience, and workload).
  - Psychological fitness (motivation and judgment, attitude towards risky behavior, overconfidence, complacency or stress)
  - Psycho-social factors (argument with a supervisor or co-worker, labor-management disputes, divorce, death in the family, personal financial problems or other domestic tensions)
  - –…

Final Report and Results of Investigation:

While the initial field phase of an accident investigation can be concluded within weeks or even days, the investigators' final report and recommendations often take longer to complete. The final report consist of factual information about the accident, an analysis, conclusions (probable cause) and also includes safety recommendations.

The final report on incident which require a company or state/federal investigation will be prepared and presented to the President or Director of Operations of Maritime Helicopters. Sharing of investigative results to the Maritime workforce will be at the discretions of the Director of Operations with recommendations by the Safety Manager. Sharing of the report beyond Maritime Helicopters will be at the discretion of the President.

Appendix A Event Analysis Tool

Section I – General Information	
Reference no:_____	Aircraft type:_____
Base:_____	Engine type:_____
Time of event:_____	Reg no:_____
Interviewer's name:_____	Related publication:_____
Interviewer's Phone no:_____	
Date of Investigation:_____	Aircrew details (for each crew member, If applicable .... Total hrs.:_____Hrs. in last 3 mths: _____ Total hrs:_____Hrs. in last 3 mths:_____

Section II – Event					
Please select the event (check all that apply)					
1. Operations Event					
( ) a. Flight delay	Days	Hrs	min	( ) e. Air turn back	**( ) 2. Aircraft damage**
( ) b. Flight cancellation				( ) f. Diversion	**( ) 3. Personal Injury**
( ) c. Gate return					**( ) 4. Rework**
( ) d. In-flight shut down					**( ) 5. Airworthiness control**
					( ) 6. Other event (explain below)

Please provide a detailed description of event

Section III – Maintenance Factors

Please select the system failure (s) that caused the event (check all that apply)

1. Installation
( ) a. Equipment/part not installed
( ) b. Wrong Equipment/part installed
( ) c. Wrong Orientation
( ) d. Improper location
( ) e. Incomplete installation
( ) f. Extra parts installed
( ) g. Access not closed
( ) h. System/equipment not deactivated/reactivated
( ) i. Damage on installed
( ) j. Cross connection
( ) k. Mis –rigging
( ) l. Life expired part fitted

2. Servicing
( ) a. Not enough fluid
( ) b. Too much fluid
( ) c. Wrong fluid type
( ) d. Required Servicing not Performed
( ) e. Access not closed
( ) f. System/equipment not Deactivated/reactivated

3. Repair
( ) a. Incorrect
( ) b. Unapproved

4. Fault isolation/test
( ) a. Did not detect fault
( ) b. Not found by fault isolation
( ) c. Not found by operational/functional test
( ) d. Not found by inspection
( ) e. Access not closed
( ) f. System/equipment not deactivated/reactivated

5. Foreign Object Damage
( ) a. Material left in aircraft/engine
( ) b. Debris falling into open system
( ) c. Debris on ramp

6. Aircraft/Equipment Damage
( ) a. Tools/equipment used improperly
( ) b. Defective tool/equipment used
( ) c. Struck by/against
( ) d. Pulled/pushed/drove into

7. Personal Injury
( ) a. slip/trip/fall
( ) b. Caught in/on/between
( ) c. Struck by/against
( ) d. Hazard contacted
( ) e. Hazardous substance exposure
( ) f. Hazardous thermal environment
( ) g. Incorrect body position for manual handling

8. Other (explain below)

( )

Please describe the specific maintenance failure

Section IV – Airworthiness Factors

Please select the system failure (s) that caused the event (check all that apply)

1. Documentation and
( ) a. Incorrect/ambiguous
( ) b. Incorrect limitation applied
( ) c. Incorrectly controlled deferred
( ) d. Incorrectly deferred defect
( ) e. Records control
( ) f. Technical log oversight

2. Equipment Management and Life
( ) a. Airworthiness data Interpretation
( ) b. Airworthiness directive overrun
( ) c. Incorrect extension applied
( ) d. MEL/DDM interval compromised
( ) e. Scheduled task omitted/late

3. Planning and Management
( ) a. Communication of standards and requirements
( ) b. Configuration control
( ) c. Insufficient guidance
( ) d. Modification control
( ) e. Operational area limit
( ) f. Operational time constraints
( ) g. planning and scheduling
( ) h. Tracking and control

4. Hazard and Risk Management
( ) a. Inadequate reliability prediction
( ) b. Incorrect mitigation strategy
( ) c. Reliability data not collected
( ) d. Risk not identified
( ) e. Risk not managed

5. Other (explain below)

Please describe the specific Airworthiness failure

Section V – Flight Operations

Please select the system failure (s) that caused the event (check all that apply)

1. Pre-start
( ) a. blanks/pins not removed
( ) b. inadvertent operation
( ) c. Incorrect barometric information
( ) d. Incorrect navigational information
( ) e. Incorrect switch/control selection/position
( ) f. Missed on walkround
( ) g. incorrect weather information

2. Taxi and Take-off
( ) a. Ground collision
( ) b. Inadvertent operation
( ) c. Incorrect switch/control selection/position
( ) d. Overcontrol
( ) e. Overstress
( ) f. Overtemp
( ) g. Overtorque
( ) h. Runway excursion
( ) i. Runway incursion (
) j. Rail Rotor Strike
( ) k.

3. Flight
( ) a. Airprox
( ) b. TCAS
( ) c. Mid-air collision
( ) d. Altitude deviation
( ) e. CFIT or near CFIT
( ) f. Fuel management
( ) g. Refuel procedure
( ) h. Exceed limiting speed (gear/float etc.)
( ) i. Inadvertent operation
( ) j. Diversion/alternate issues
( ) k. Incorrect in-flight shutdown
( ) l. Incorrect switch/control selection/position
( ) m. Navigation deviation
( ) n. Overcontrol
( ) o. Overstress
( ) p. Overtemp
( ) q. Overtorque
( ) r. Automation
( ) s. Wire obstacle strike
( ) t. Rotor overspeed
( ) u. Weather
( ) v. Helideck motion (
) w. Communications
( ) x. Incorrect/invalid procedures

4.Landing
( ) a. Landing profile
( ) b. Gear up
( ) c. Gear overspeed
( ) d. Ground collision
( ) e. Brown out/Whiteout
( ) f. hard landing
( ) g. Inadvertent operation
( ) h. Incorrect switch/control section/ position
( ) i. Missed approach
( ) j. Overcontrol
( ) k. Overstress
( ) l. Overtemp
( ) m. Overtorque
( ) n. Runway Excursion
( ) o. Runway incursion
( ) p. Tail-strike
( ) q. Deck motion
( ) r. unstablized approach

5. Shutdown
( ) a. Inadvertent operation (
) b. Incorrect switch/control selection/position
( ) c. Wind/weather
( ) d. Helideck motion
( ) e. Tie down

6. General
( ) a. Access not closed
( ) b. Checklists/procedures
( ) c. Equipment not secured
( ) d. Incorrect use of emergency equipment
( ) e. Loose article

7. PersonalInjury
( ) a. Slip/trip/fall
( ) b. Caught in/on/between
( ) c. Struck by/against
( ) d. Hazard contacted
( ) e. Hazardous substance exposure
( ) f. Hazardous thermal environmental
( ) g. Dazzle/blinding (e.g. laser)
( ) h. Other injury

8. Other (explain on next page)

Please describe the specific Flight Operations failure

Section VI- Ground Handling

Please select the system failure (s) that caused the event (check all that apply)

1. Use of equipment
( ) a. Driven too fast
( ) b. Not for intended use
( ) c. Defective equipment used
( ) d. Incorrectly Operated
( ) e. Equipment left in the wrong place
( ) f. Driven/pushed/towed into
( ) g. Runway incursion
( ) h. Marshaller
( ) i. Incorrect procedures

2.Aircrafthandling/loading
( ) a. Pushed into
( ) b. Towed into
( ) c. Incorrectly loaded
( ) d. Incorrect procedures

3. Personal injury
( ) a. Slip/Rip/fall
( ) b. Caught in/on/between
( ) c. Struck by/against
( ) d. Hazard contacted
( ) e. Hazardous substance exposure
( ) f. Hazardous thermal environment
( ) g. Incorrect body position for manual handling

4. Refuelling
( ) a. Wrong fuel
( ) b. Overfilled
( ) c. Underfilled
( ) d. Contamination
( ) e. Fuel spill
( ) f. Incorrect procedures

5. Other (explain below)

Please describe the specific Airworthiness failure

Section VII- Natural Operation Factors		
Please select the system failure(s) that caused the event		
1. Weather	( ) f. Crosswinds	**2 Wildlife**
( ) a. Lightning	( ) g. Deck motion	( ) a. bird strike
( ) b. Sandstorm	( ) h. Icing	( ) b. wildlife strike
( ) c. Turbulence	( ) i. Fog or poor visibility	
( ) d. Windshear	( ) j. Strong wind	
( ) e. Whiteout	( ) k. High sea states	
	( ) l. other	

please describe the specific natural event

Section VIII- Contributing Factors		
1. Individual	( ) i. State of consciousness	***Physical and mental limitations***
Mental states	( ) j. Effects of stress	( ) p. body size/strength
( ) a. Decision making	( ) k. Visual perception	( ) q. Eyesight
( ) b. Emotional state		( ) r. Hearing
( ) c. Memory	***Physiological states***	( ) s. Mental capacity
( ) d. Motivation	( ) l. Fatigue	( ) t. Motor skills/coordination
( ) e. Personality	( ) m. Hypoxia	
( ) f. Problem solving	( ) n. Other flight effects	
( ) g. Situational awareness	( ) o. Toxic substances	
( ) h. State of arousal		

please describe the specific individual factor

2. Communication ( ) a. between colleagues ( ) b. Between departments ( ) c. Between flight crew and ground personnel ( ) d. Between individuals and supervisors ( ) e. Between shifts	( ) i. State of consciousness ( ) f. Between supervisors and management ( ) g. Briefing ( ) h. Feedback ( ) I. Handover ( ) j. Personality Conflicts ( ) k. Rank/position authority gradient	***Physical and mental limitations*** ( ) l. Standard proper terminology ( ) m. Language ( ) n. Other

please describe the specific communication factor

3. Competence ( ) a. aircraft knowledge ( ) b. Computing skills ( ) c. Communication skills	( ) d. Equipment/tools/knowledge ( ) e. Language proficiency ( ) f. Organizational/Process knowledge	( ) g. Task knowledge ( ) h. Teamwork skills ( ) i. Technical skills ( ) j. Other
please describe the specific competence factor		
4. Leadership/Supervision ( ) a. Delegation/task assignment ( ) b. Issue resolution ( ) c. Planning/organization of tasks	( ) d. Prioritization of work ( ) e. Supervision level ( ) f. Time constraint	( ) g. Leadership style ( ) h. Team composition ( ) i. Other
please describe the specific leadership/supervision factor		

5. Task ( ) a. Complex ( ) b. Confusing	( ) c. Different from other similar tasks ( ) d. New task or task chance	( ) e. Repetitive/monotonous ( ) f. Workgroup normal practice ( ) g. Other
please describe the specific task factor		
6. Organizational		
Resource management ( ) a. equipment resources ( ) b. Financial resources ( ) c. Informational technology resources ( ) d. Personnel resources	***Organizational process*** ( ) e. Workload ( ) f. Organizational communications ( ) g. Procedural guidance ( ) h. Program oversight/mgt	( ) i. Risk management ( ) j. Provision of training
please describe the specific organizational factor		

7. Aircraft/equipment-design/configuration/parts ( ) a. Complexity ( ) b. Configuration variability ( ) c. Ergonomic design	( ) d. Accessibility ( ) e. User friendliness ( ) f. Easy to install incorrectly ( ) g. Part labelling	( ) h. Part use ( ) i. Part availability ( ) j. Training ( ) k. Other
please describe the specific aircraft equipment factor		
6. Equipment/Tools/Safety Equipment ( ) a. Complexity ( ) b. Appropriateness for the task ( ) c. Accessibility ( ) d. Labeling	( ) e. Correctness of use ( ) f. Layout ( ) g. Calibration ( ) h. Instructions ( ) i. Use ( ) j. Training	( ) k. Availability ( ) l. Control ( ) m. Reliability ( ) n. Safety ( ) o. Suitability for environment
please describe the specific equipment/tools/safety equipment factor		

9. Facilities/workshop ( ) a. Cleanliness ( ) b. Confined space ( ) c. Hazardous/toxic substance	( ) d. Labels/placards/signage ( ) e. Lighting ( ) f. Markings ( ) g. Power sources	( ) h. Ventilation ( ) i. Vibration ( ) j. Tempurature
please describe the specific facilities/workspace factor		
10. Information (work cards, manuals, etc.) ( ) a. Adequacy ( ) b. Correctness	( ) c. Comprehensibility ( ) d. Use of information ( ) e. Volume of information	( ) f. Availability/accessibility ( ) g. Control ( ) h. Update process
please describe the specific information factor		

11. Physical environment	( ) d. Maneuvering forces in flight	( ) h. Snow
( ) a. Cold	( ) e. Noise	( ) i. Wind
( ) b. Hot	( ) f. Rain	( ) j. Terrain
( ) c. Humidity	( ) g. Sand	( ) k. Visibility

please describe the specific physical environment factor

12. SUMMARY OF FACTORS. List Boxes Checked

Section II -Event.....
Section III -Maintenance Factors.....
Section IV - Airworthiness Factors.....
Section V -Flight Operations.....
Section VI -Ground Handling.....
Section VII - Natural Operating Factors.....
Section VIII -Contributing Factors.....

Section IX – Event Prevention Strategies
What current existing procedures, processes and /or policies in your organization are intended to prevent the incident, but did not?

List recommendations for event prevention strategies		
Recommendationno.	**Contributing factor**	**Prevention strategy**

Section X – Summary of Contributing Factors, Error and Events

The purpose of this section is to provide space to write out a brief summary of what happened and what was found during the investigation. It will also provide a useful summary when briefing a Review Group, if applicable.

Any supporting documents, photographs, etc. should be scanned and attached to this report.

Appendix B: Physical Evidence

The collection and preservation of physical evidence as well as the security and preservation of evidence at an accident/incident scene is vital to the investigation. Guidance from FAA, NTSB, OSHA and other governmental or university resources may be used to accomplish these tasks.

The Quality and Safety Manager will keep, on hand, items for incident investigation which will follow industry best practices for such a kit which may include: Camera/s, measuring equipment (tape measures and rulers), collection bags, engineering or surveyor tape to secure investigation areas, surveying flags and spray paint or paint markers for marking sites. Also, safety equipment for the investigative process will be held in such a kit to include protective gloves or other PPE for chemical contact, respiratory protection

First responder guidance for evidence preservation is contain in FAA Advisory Circular **150/5200-12C.** Maritime Helicopter employees will ensure local first responders are aware of evidence collection as a priority subordinate to the saving of life and limb.

This appendix will discuss industry best practices for collection and preservation of evidence.

Physical Evidence—General

Evidence is gathered for three primary reasons:

- To establish accident sequence
- To provide documentation to support the investigation facts, findings, and recommendations
- To identify causal and contributing factors

NOTE: Physical and photographic evidence gathered during accident investigations may be used in other official proceedings (administrative, civil, and criminal) and must be collected and processed correctly to maintain the integrity of the evidence. Generally the team's law enforcement representative is the most qualified individual to do this.

Physical Evidence Preservation and Collection

The chief investigator should determine what evidence is fragile or perishable and may be destroyed or lost due to weather or theft, or moved, in order to protect valuable equipment or evidence. This may require increasing the security personnel, expanding the site security perimeter, covering the site with plastic, obtaining a secured facility, or carefully packaging and removing evidence.

The chief investigator should, with cooperation from the law enforcement representative, establish:

- What evidence needs to be gathered?
- Procedures to be used.
- Who will gather the evidence?
- The evidence and chain-of-custody logs.
- Where evidence should be stored.

Physical evidence, such as equipment and parts, need to be "bagged and tagged" at the time of collection. Large items, such as vehicles or construction items, should be secured.

The law enforcement representative will establish logs for all ground accident evidence. It is imperative that all evidence be cataloged and accounted for at all times. Some evidence may be perishable if not collected as soon as possible. The originals or a copy of important documents (evidence, potential evidence) should be placed in the investigation case file.

All aviation accident evidence gathered during aviation accident investigations will be maintained by the NTSB.

Types of Physical Evidence

There are three principal types of physical evidence: Human, material, and environmental.

Human evidence includes:

- Training records
- Qualifications and certifications
- Time and attendance records
- Dispatch logs
- Risk assessments (JHAs)
- Briefings
- Witness statements
- Policies and procedures
- Medical records and test results
- Autopsy and toxicology reports

- Autopsies can provide valuable information to the accident investigation team. The rules for autopsies vary from State to State. Most States require an autopsy if the death was not attended by a physician.

- The team leader or the law enforcement representative should determine if an autopsy will be conducted. If so, request analysis of samples of body fluids.

- If an autopsy is not planned, determine whether the family would agree to one if the information gained would benefit the investigation.

- Firefighter Autopsy Protocol: Firefighter beneficiaries will normally receive a death benefit only if an autopsy is completed. A waiver may be given on a case-by-case basis. The team leader should ensure that the medical examiner has a copy of this protocol.

Material evidence includes:

- Equipment
- Tools
- Machinery
- Vehicles

Environmental evidence includes:

- Weather reports
- Weather damage analysis
- Terrain analysis
- Environmental hazards
- River volume and flow

Photographic Evidence—General

A. One of the most useful tools the investigator can bring to the accident scene is a camera. The camera shows the view seen by a witness and can record documents. Digital cameras (3 or 4 megapixels) and cameras that process their own film are ideal for this application. Film from 35 millimeter cameras can be converted to digital format if developed correctly.

B. While video cameras have their uses, photographs may be more useful because they can be enlarged, printed in multiple copies, and placed in the factual section.

C. Depending on the accident's complexity, a professional photographer may be needed.

Photographic Documentation

A. Photographs do not have to be taken in the order the investigator intends to look at them. Shoot all the distant and medium shots first. Those shots can be taken with a handheld camera without extra equipment. Afterward, take closeup shots with a tripod, flash, or cable release. This method saves time because you do not have to switch back and forth between the two types of photography.

B. Basic Types of Documentary Photographs.

1. Perishable Evidence. These photographs document things that are likely to change or disappear if not photographed immediately. Such photographs may include shots of an accident's aftermath or a rescue in progress, gauge readings, ground scars, radio settings, fire damage, and the positions of switches on equipment.

2. Aerial Views. When performing aerial photography, photographers need an aviation plan, approved by the unit aviation officer. If possible, photograph aerial views early. The appearance of the accident site from the air will change rapidly as investigators move through it. Important locations on the ground can be marked with yellow flagging or other suitable material (for example, a yellow fire shirt). Shoot from different angles and at different altitudes.

3. Overviews of the Scene. Photograph the equipment wreckage at the accident site from the eight points of the compass (N., NE., E., SE. S., and SW., W., NW). If the accident scene is spread out, try a series of overlapping pictures. The prints can be matched at their edges to create a panoramic view.

4. Significant Scene Elements. Try to establish the terrain gradient through photographs. Photograph ground scars to record information that will allow their size and depth to be analyzed in the future.

5. Site Inventory. Photographs can help inventory the accident site and document personal protective clothing equipment and other safety equipment, including the victim's personal effects and clothing. The location of each item may be plotted on a scaled map using a fixed point of reference.

6. Close-ups. Bracket exposures for close-ups by taking two photographs with slightly different exposure adjustments (f-stop and shutter speed). Use a tripod or monopod, as appropriate.

7. Documents. Photographs can be used to record documents that cannot be retained. Such documents include licenses and logbooks, or maps and charts.

8. Witnesses' Views. It may be important to document the witnesses' views of the accident. Because the witnesses may have had wide-angle views, use a tripod and the panoramic technique to duplicate the views with photographs.

9. Exemplars. An exemplar is a model or a pattern for an actual object. Sometimes it is difficult to tell from a wreckage photograph what the part or component is supposed to look like. In some investigations, it is important to have pictures of an identical undamaged part or component for comparison.

10. Wildland Fire Photos. In addition to the types of photographs previously discussed, the following photographs are needed for fire management accidents:
    - Final resting position of victims, equipment, trees, and other relevant items.
    - Fire line construction at the accident site.
    - Equipment carried or worn by personnel (personal and official gear).
    - Firefighters' personal protective clothing and equipment.
    - Safetyequipment.
    - Vegetative conditions (before and after, if possible).
    - Surrounding terrain, structures, and orientation.
    - Fire origin and buildup.
    - Shelter deployment—shelter, packaging, and the position (side, back) where it was carried.
    - Incident command post facilities or equipment.

11. Presentation. Photographs used in the factual section should be mounted and have captions attached. An example of a documentary caption would be: "View of damaged driver's door looking north." Each photo should include the name of the photographer and the date the photo was taken.

Any supporting documents, photographs, etc. should be scanned and attached to this report.